

IN THE CLAIMS:

The following listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

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- 1 1. (Currently Amended) A system for identifying pixels inside a graphics primitive of a
2 raster image comprising:
3 a memory for storing a raster image; and
4 a graphics engine coupled to the memory and ~~including~~ comprising a pipeline structure
5 configured for both sequential and parallel processing, the pipeline structure receiving
6 information related to polygonal portions of the raster image from the memory and information
7 related to graphics primitives from a source for determining whether a polygonal portion of the
8 raster image is at least partly inside the graphics primitive
- 1 2. (Original) The system of claim 1 wherein the pipeline structure further comprises a
2 predetermined number of sequential logic circuits and a predetermined number of parallel logic
3 circuits.
- 1 3. (Original) The system of claim 1 wherein the pipeline structure divides the polygonal
2 portion into a predetermined number of polygonal subportions if the polygonal portion is at least
3 partly inside the graphics primitive.
- 1 4. (Original) The system of claim 1 wherein the pipeline structure determines whether the
2 polygonal portion of the raster image is at least partly inside the graphics primitive by evaluation
3 of edge functions of the graphic primitive.
- 1 5. (Original) The system of claim 4 wherein each edge function of the graphics primitive is
2 based on a general edge function, $e(x, y) = e_0 + n_x x + n_y y$ where e_0 is a constant, n_x is the x -
3 component of a normal vector \underline{n} which is normal to an edge of the primitive and n_y is the y -
4 component of the normal vector \underline{n} .
- 1 6. (Original) The system of claim 4 wherein the edge function is evaluated at a corner
2 vertex of the polygonal portion, the corner vertex being farthest in a positive direction from a
3 primitive edge associated with the edge function.

1 7. (Original) The system of claim 2 wherein the pipeline structure is configured such that
2 the sequential logic circuits are coupled together in series followed by the parallel logic circuits
3 coupled together in parallel.

1 8. (Original) The system of claim 2 wherein the pipeline structure comprises seven
2 sequential logic circuits connect in series and seven parallel logic circuits coupled together in a
3 multi-stage pyramid structure.

1 9. (Original) The system of claim 3 wherein the pipeline structure determines the two
2 polygonal subportions by determining midpoint values of two opposite sides of the polygonal
3 portion of the raster image and using the midpoint values as vertices of the two polygonal
4 subportions.

1 10. (Original) The system of claim 1 wherein the pipeline structure further comprises a
2 predetermined number of pixel engines for determining attribute values associated with each
3 pixel.

1 11. (Original) The system of claim 1 wherein the polygonal portion of a raster image
2 has a width ΔX and a height ΔY , each of the width ΔX and the height ΔY having a
3 value of 2^m .

1 12. (Previously Presented) A method of identifying pixels inside a graphics primitive
2 of a raster image, comprising the steps of:

3 (a) determining whether a polygonal portion of the raster image is at least partly
4 inside the graphics primitive by using a coordinate reference frame located at a geometric
5 center of the polygonal portion;

6 (b) dividing the polygonal portion of the raster image into a predetermined
7 number of polygonal subportions if the polygonal portion of the raster image is at least
8 partly inside the graphics primitive;

9 (c) determining whether each polygonal subportion of the raster image is at least
10 partly inside the graphics primitive; and

11 (d) further dividing the polygonal subportion into a predetermined number of
12 polygonal subportions if the polygonal subportion is at least partly inside the graphics
13 primitive and is larger than a pixel.

1 13. (Original) The method of claim 12 further comprising the step of recursively
2 performing (c) and (d) until there are no more polygonal subportions that are at least
3 partly inside the graphics primitive.

1 14. (Previously Presented) The method of claim 12, wherein the determining step (a)
2 further comprises the step of receiving a plurality of values for corner vertices of the
3 polygonal portion and arithmetic edge functions, each of the arithmetic edge functions
4 corresponding to an edge of the graphics primitive.

1 15. (Original) The method of claim 14, wherein the determining step (a) further comprises
2 the step of evaluating an arithmetic edge function received at a corner vertex of the polygonal
3 portion, the corner vertex being farthest in a positive direction relative to the corresponding edge
4 of the graphics primitive.

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1 16. (Original) The method of claim 15 wherein the polygonal portion is at least partly inside
2 the graphics primitive if all arithmetic edge functions evaluated are positive.

1 17. (Original) The method of claim 12 wherein the dividing step (b) further comprises the
2 step dividing the polygonal portion into two polygonal subportions by determining midpoint
3 values of two opposite sides of the polygonal portion.

1 18. (Original) The method of claim 12 wherein the dividing step (b) further comprises the
2 step of sequentially deriving two new sets of arithmetic edge functions associated with a
3 translated coordinate reference frame located at a geometric center of a corresponding one of the
4 polygonal subportions.

1 19. (Original) The method of claim 12 wherein the dividing step (b) further comprises
2 the step of sequentially outputting multiple sets of information, wherein each set of
3 information includes corner vertices of one of the created polygonal subportions and a
4 corresponding new set of derived arithmetic edge functions.

1 20. (Previously Presented) An electronically-readable medium having embodied
2 thereon a program, the program being executable by a machine to perform method steps
3 for identifying pixels inside graphics primitives of a raster image, the method steps
4 comprising:

5 (a) determining whether a polygonal portion of the raster image is at least partly
6 inside the graphics primitive by using a coordinate reference frame located at a geometric
7 center of the polygonal portion;

8 (b) dividing the polygonal portion into a predetermined number of polygonal
9 subportions if the polygonal portion is at least partly inside the graphics primitive;

10 (c) determining whether the polygonal subportion is at least partly inside the
11 graphics primitive for each polygonal subportion; and

12 (d) dividing the polygonal subportion into a predetermined number of polygonal
13 subportions if the polygonal subportion is at least partly inside the graphics primitive and
14 the polygonal subportion is larger than a pixel.

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1 21. (Original) The electronically-readable medium of claim 20 further comprising the
2 step of recursively performing steps (c) and (d) for each polygonal subportion larger than
3 a pixel that is at least partly inside the graphics primitive.

1 22. (Previously Presented) A method of identifying pixels inside a graphics primitive
2 of a raster image comprising the steps of:

3 selecting a tile including a pixel;

4 defining a coordinate reference frame located at a geometric center of the tile;

5 determining if a portion of the tile is within the graphics primitive;

6 dividing the tile into subtiles if a portion of the tile is within the graphics
7 primitive; and

8 recursively dividing each subtile having a portion within the graphics primitive
9 until the subtile is equal in size to a pixel.

1 23. (Original) The method of claim 22 further comprising the step of disregarding the tile or
2 subtile from subsequent decomposition if the tile or subtile is outside of the graphics primitive.

1 24. (Original) The method of claim 22 wherein the step of determining further comprises
2 evaluating the tile at a corner vertex which is farthest in a positive direction relative to a current
3 edge of the graphics primitive.

1 25. (Original) The method of claim 22 wherein the step of recursively dividing further
2 comprises determining if the subtitle is at least partly within the graphics primitive by
3 evaluating the subtitle at a corner vertex which is farthest in a positive direction relative to
4 a current edge of the graphics primitive.

B. 1 26. (Previously Presented) An electronically-readable medium having embodied
2 thereon a program, the program being executable by a machine to perform method steps
3 for identifying pixels inside graphics primitives of a raster image, the method steps
4 comprising:
5 selecting a tile including pixels;
6 defining a coordinate reference frame located at a geometric center of the tile;
7 determining if a portion of the tile is within the graphics primitive;
8 dividing the tile into subtitles if a portion of the tile is within the graphics
9 primitive; and
10 recursively dividing each subtitle having a portion within the graphics primitive
11 until the subtitle is equal in size to a pixel.
